

Application No.: 10/623,037

JAN 23 2007

Docket No.: TOW-033

AMENDMENTS TO THE CLAIMS

1. (Original) A proton conductive solid polymer electrolyte comprising a basic polymer and an acidic group-possessing polymer which has an acidic group, wherein:

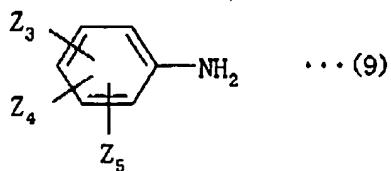
said acidic group-possessing polymer and said basic polymer are compatibilized with each other; and

said acidic group of said acidic group-possessing polymer exists in an amount of not less than 3×10^{-3} mole per gram of said acidic group-possessing polymer.

2. (Original) The proton conductive solid polymer electrolyte according to claim 1, wherein a repeating unit of said basic polymer has a mole number which is not less than 1/10 of a mole number of said acidic group of said acidic group-possessing polymer.

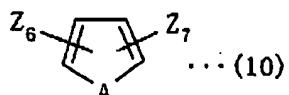
3. (Original) The proton conductive solid polymer electrolyte according to claim 1, wherein said basic polymer is at least one selected from the group consisting of polyaniline, polypyrrole, polythiophene, and respective derivatives thereof.

4. (Currently Amended) The proton conductive solid polymer electrolyte according to claim 3, wherein at least one monomer of said derivatives is any one of substances represented by the following chemical formulas (9) and (10):



Application No.: 10/623,037

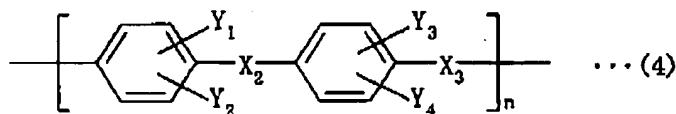
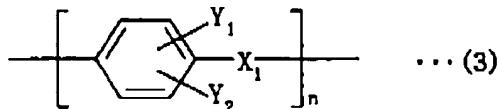
Docket No.: TOW-033



A: NH, S

wherein Z₃ to Z₇ are functional groups which are independently selected from H, CH₃, C₂H₅, F, Cl, Br, I, and Ph, and A in said chemical formula (10) represents any one of NH and S.

5. (Original) The proton conductive solid polymer electrolyte according to claim 1, wherein said acidic group-possessing polymer is any one of substances represented by the following chemical formulas (3) and (4):

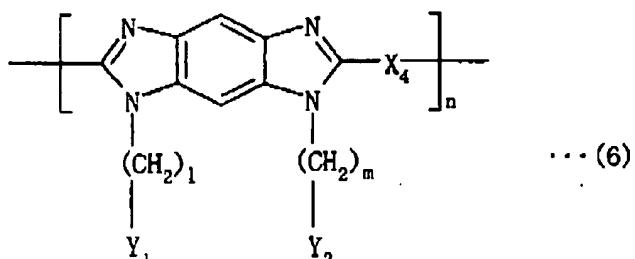
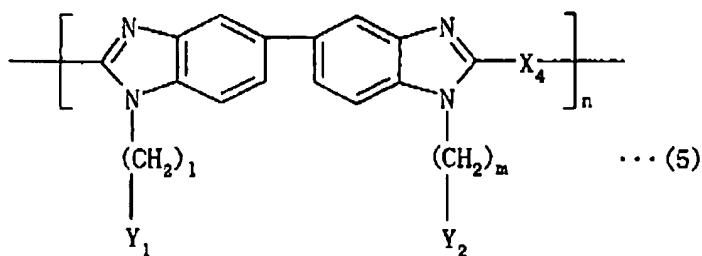


wherein X₁, X₂, and X₃ are any one of S, SO₂, O, CO, and CH₂, X₂ and X₃ may be identical with each other or different from each other, and at least one of Y₁, Y₂, Y₃, and Y₄ is any one of SO₃H, OPO(OH)₂, and PO(OH)₂.

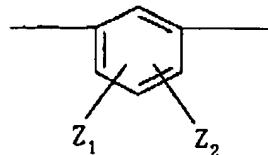
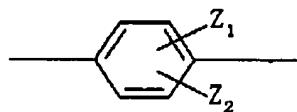
6. (Withdrawn) The proton conductive solid polymer electrolyte according to claim 1, wherein said acidic group-possessing polymer is any one of substances represented by the following chemical formulas (5) and (6):

Application No.: 10/623,037

Docket No.: TOW-033



wherein l and m are integers of 1 to 10, which may be same number or different numbers, and X4 is any one of those represented by the following chemical formulas:



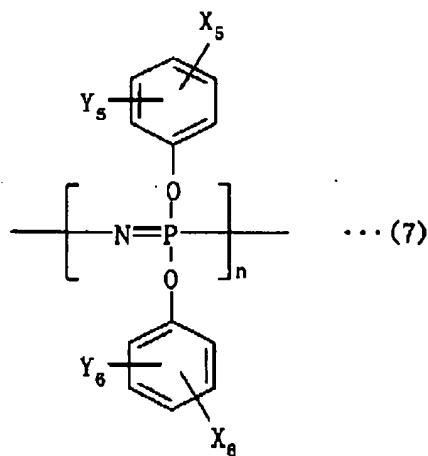
wherein Z1 and Z2 are functional groups which are independently selected from H, SO₃H, OPO(OH)₂, and PO(OH)₂.

7. (Withdrawn) The proton conductive solid polymer electrolyte according to

Application No.: 10/623,037

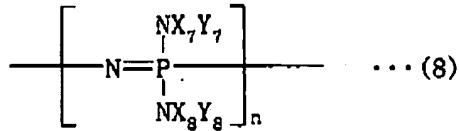
Docket No.: TOW-033

claim 1, wherein said acidic group-possessing polymer is a substance represented by the following chemical formula (7):



wherein X5 is SO₃H, X6 is any one of H and SO₃H, and Y5 and Y6 are functional groups which are independently selected from H, CH₃, C₂H₅, F, Cl, and Br.

8. (Withdrawn) The proton conductive solid polymer electrolyte according to claim 1, wherein said acidic group-possessing polymer is a substance represented by the following chemical formula (8):



wherein X7 is (CH₂)_mSO₃H (m is an integer of 1 to 10), X8 is any one of (CH₂)_mSO₃H (m is an integer of 1 to 10), NH₂, H, CH₃, C₂H₅, and C₆H₅ (phenyl group: Ph), and Y7 and Y8 are functional groups which are independently selected from H, CH₃, C₂H₅, and Ph.

Application No.: 10/623,037

Docket No.: TOW-033

9. (Withdrawn) A method for producing a proton conductive solid polymer electrolyte comprising a basic polymer and an acidic group-possessing polymer which has an acidic group, said method comprising:

mixing said acidic group-possessing polymer, a basic monomer, and a compound for producing a metal ion in a solvent, or mixing a metal complex compound composed of a metal ion and said acidic group-possessing polymer and a basic monomer in a solvent;

polymerizing said basic monomer to produce said basic polymer and compatibilizing said basic polymer and said acidic group-possessing polymer to produce a compatibilized polymer; and

separating said compatibilized polymer from said solvent.

10. (Withdrawn) The method for producing said proton conductive solid polymer electrolyte according to claim 9, wherein a mole number of said metal ion is not less than a mole number of said acidic group of said acidic group-possessing polymer.

11. (Withdrawn) The method for producing said proton conductive solid polymer electrolyte according to claim 9, wherein said basic monomer mixed in said mixing step is added in such an amount that a mole number of said basic monomer is not less than 1/10 of a mole number of said acidic group of said acidic group-possessing polymer.

12. (Withdrawn) The method for producing said proton conductive solid polymer electrolyte according to claim 9, further comprising a step of heat-treating said compatibilized polymer.

13. (Withdrawn) The method for producing said proton conductive solid polymer electrolyte according to claim 9, wherein an alkali metal ion or an alkaline earth metal ion is

Application No.: 10/623,037

Docket No.: TOW-033

used as said metal ion.

14. (Withdrawn) The method for producing said proton conductive solid polymer electrolyte according to claim 13, wherein Li^+ , Na^+ , and/or K^+ is used as said alkali metal ion.

15. (Withdrawn) The method for producing said proton conductive solid polymer electrolyte according to claim 13, wherein Ca^{2+} is used as said alkaline earth metal ion.